EXHIBIT 13

August 23, 1984

TO: V. M. Dugan

FROM: B. J. Hickelson

SUBJECT: MTBE Contamination of Ground Water

The following is in response to your August 8, 1984, memo to Mr. S. D. Curran requesting information on additional potential ground water contamination problems that are associated with the use of MTBE in gasoline.

First MTBE, when dissolved in ground water, will migrate farther than BTX before soil attenuation processes stop the MTBE migration.

For example, a town well in Thurmont, Maryland was contaminated by IPE, a similar ether compound, even though the soluble BTX plume migration was such that the well was not contaminated by these components. Well replacement costs are expected to exceed $500k in this case.

Another example is at Jacksonville, Maryland where the leading edge of the Gulf MTBE plume has not been controlled and migrated over twice the distance of the Exxon BTX plume migration, which has been halted. We are now facing onerous Federal EPA compliance actions which will add costs to this multimillion dollar incident.

Second, MTBE has lower odor and taste thresholds than BTX. Therefore low, non-hazardous, analytically non-detectable levels of MTBE continue to be a source of odor and taste complaints in affected drinking water. This low threshold will extend the clean up and testing time to close out a well contamination incident.

Third, MTBE cannot be removed by carbo.. adsorbtion. Small household carbon filtration units are used by Exxon to treat private drinking supplies contaminated by BTX. This option would not provide adequate treatment for water supplies additionally contaminated by MTBE. Air stripping or a combination of air stripping and carbon adsorbtion would be required to clean up water contaminated by BTX and MTBE. Attachment A compares initial and operating costs associated with various treatment options.

In summary, there appear to be three reasons MTBE could add to ground water incident costs and adverse public exposure.

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Based on higher mobility and taste/odor characteristics of MTBE, Exxon's experiences with contaminations in Maryland and our knowledge of Shell's experience with MTBE contamination incidents, the number of well contamination incidents is estimated to increase three times following the widespread introduction of MTBE into Exxon gasoline. With 62 ground water clean up activities underway at an average annual cost of $3M, this represents an increase of some 120 or $6M to a total of 180 and $9M annual cost.

Finally, the closing-out of these incidents would take longer and treatment costs would be higher by a factor of 5 (Attachment A). Therefore, we estimate that by extending close-out times the 180 incidents would double to over 300. Shell Oil currently has over 300 ongoing contamination incidents which resulted at some 4,000 retail facilities, versus 62 incidents at Exxon's 7,000 retail facilities. The estimated additional costs involved would result in annual leaker incident costs exceeding $20M.

There is a fourth, and probably the most significant, consideration. Any increase in potential ground water contamination will also increase risk exposure to major incidents. Since 1978, Exxon has been exposed to three major ground water incidents (East Meadow, L.I.; Canob Park, R.I.; Jacksonville, MD). While the most recent cases are unsettled, the cost of these incidents can be as high as $7M each based on East Meadow. Therefore, if the trend of one $7M suit every two years is increased commensurate with the number of ongoing outstanding incidents (i.e., current 62 to over 300) then annual major incident costs would increase from $3.5M to some $18M.

Taking the above four factors into consideration, it would appear that widespread use of MTBE has the potential of increasing our ongoing contamination incidents from a current of 62 to over 300 and costs from $6.5M ($3M and $3.5M) to over $40M ($+20M and $+18M).

Please call me if you have any questions regarding the concerns outlined above.

Barbara J. Mickelson

BJM:jm

c - S. D. Curran
J. S. Dick
R. R. Eaton

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Attachment A

Treatment Costs for 40 GPM Water Supply

	Carbon Adsorbtion[1]	Air Stripping[2]
Capital Cost:	$3,000	$15,000
Annual Operating	$1,200	$400

[1] 2 carbon filter units in series, with backwash capability (Calgon)

[2] 15 ft. tall, 1 ft. diameter air stripping column with 1/3 HP blower (Calgon)

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